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AUTOMATION AND JOBS

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AUTOMATION AND JOBS

THE DECLINE of unemployment, though substantial in recent months, has lagged far behind the rise in business activity that has been under way since the 1957-58 recession touched bottom in the spring of last year. Industrial production, business profits, personal income, and retail sales all have climbed to record highs. The nation's total output of goods and services reached an annual rate of $467 billion in the first quarter of 1959—well above the pre-recession record rate of $446 billion in the third quarter of 1957. For the first time in two years, the word "boom" has started to appear in the writings of economic analysts. Yet the number of people out of work is considerably larger today than it was on the eve of the recession in the summer of 1957.[1]

It has become normal for employment to increase and unemployment to drop more slowly than business improves in a period of general recovery.[2] The lag is accounted for by the fact that efforts by management to cut costs and trim waste when sales are poor do not ordinarily show up in the form of increased labor productivity while output remains low. As a rule, it is only when a revival of demand has led to increased production that technological improvements and cost-conscious policies initiated during the downturn begin to pay off. Ewan Clague, Commissioner of Labor Statistics, told the Joint Economic Committee, Jan. 29: "Our experience during the postwar period has been that the first full year of recovery after a recession has usually shown a higher-than-average increase in output per manhour." [3]

Unemployment totals, adjusted for seasonal factors, will probably remain substantial throughout 1959—not only be-

[1] The number looking for work rose from a low of 2,609,000 in August 1957 to a peak of 5,198,000 in March 1958 and had declined by April 1959 only to 3,627,000.

[2] See "Lag in Employment," *E.R.R.*, 1959 Vol. I, pp. 5-8.

[3] Clague added: "In both 1950 and 1955, for example, the [productivity] increase for manufacturing was close to 7 per cent; for the private non-farm sector, the increases ranged from 4.5 to 6 per cent." Productivity has increased over the whole period since World War II at an average of less than 3 per cent a year.

cause of a spurt in productivity that may exceed 6 per cent for the year (twice the postwar average), but also because the labor force tends to grow faster when job opportunities are expanding.[4] Of greater concern is the possibility that the nation may have to face an unemployment problem for some years to come.

Enterprises large and small have been moving to more favorable locations and leaving former employees without jobs in the old industrial centers. Many companies, confronted by rising wage and salary costs and by demands for new products that cannot be made by old processes, are substituting machinery for manpower wherever feasible. The result is evident in recent government statistics. Industrial production rose to a record 149 per cent of the 1947-49 average in April, though 3.6 million job-seekers were still unemployed. Two years earlier, in March 1957, when the production index stood at 145, only 2.9 million persons were seeking work.

Problems and Opportunities in Automation

A growing share of new industrial and business installations apply principles of highly mechanized engineering or of electronic systems generally referred to as automation. Automation was first applied on a big scale in development of World War II weapons systems. Largely because of continuing defense needs, research and development today is a $10 billion industry.

The pace at which automation has been utilized for nondefense purposes has picked up markedly in the past five years and will probably gain added momentum in the years immediately ahead. Harvey S. Firestone, Jr., said last Dec. 1 that industry had only "scratched the surface" in applying automation, nucleonics, and electronics to manufacturing techniques and business functions. He predicted that "In less than a decade, they will become as much standard equipment in commerce and industry as the typewriter, the cash register, and the telephone are today."

Speculation on the effects of the new technology has produced diametrically opposed conclusions. It is asserted on the one hand that automation will destroy traditional skills; take the interest out of many jobs and wipe out many

[4] Clague pointed out to the Joint Economic Committee, April 25, that "larger numbers of youngsters and women" enter the labor force as job opportunities open up. "Many of these workers get jobs immediately, but others spend short periods of time in search of jobs and add to the number of unemployed."

others; and lead to more conflicts between employers and employees than the country has witnessed for decades. On the other hand, it is contended with equal vigor that automation will call forth new and higher skills; eliminate much hard physical labor; make work more challenging and create new jobs; develop new raw materials; and provide increasing leisure and a steadily rising standard of living.

The course of automation to date gives some support to all points made on both sides of the argument. Whether automation becomes a blessing or a curse will depend on millions of individual, group, and government decisions still to be made. Most unemployment problems can be solved by economic expansion, and automation affords the productivity gains which are the basis of expansion. The fundamental task is to find ways to ease the great number of dislocations and strains which are the inevitable by-product of radical new technology.

Most authorities agree that automation covers developments that differ in kind, not merely in degree, from what has gone before. Ted F. Silvey, A.F.L.-C.I.O. expert on the subject, said on May 1: "Automation really is comprised of three developments and their application, separately and in combination"—highly engineered mechanization, "feedback" control, and electronic computers. The first two affect production in the factory; a feedback system is essentially an electronic computer or similar "miracle machine" adapted for industrial purposes. Electronic computers are the chief instruments of what has come to be called office automation.

In the case of a factory, highly engineered mechanization is effected by integration of machinery and instrumentation in such a way that work in process is automatically handled and transferred from one operation to the next. Feedback control is the process by which equipment at each station is automatically "told" what to do; work in process is continually inspected for quality by delicate sensory devices, and any inaccuracies or errors in the operation of a machine are automatically corrected.[5]

Progress of Automation in Manufacturing

These technological developments have enormous significance for both blue-collar and white-collar workers, al-

[5] See "Automation of Industry," *E.R.R.*, 1955 Vol. I, pp. 3-5.

though their most noticeable effect so far has been on blue-collar workers in manufacturing. It took 800,000 fewer workers in April 1959 to turn out a much larger quantity of manufactured goods than had been produced in April 1957. The index of industrial production for manufacturing rose to 152 in April of this year, compared to 145 in April 1957, but total manufacturing employment fell off in that period from 16.8 million to 16 million.

"Continuous-flow" industries have been highly automated for some time. Long-established industries like glass making, sugar refining, baking and confectionery making changed over from the old batch method to the continuous-flow method well before World War II. Visitors to plants in newer continuous-flow industries, like oil refining, are frequently amazed by the silence prevailing; a handful of technicians can regulate the entire production process by watching gauges and turning dials. Automation is continuing its penetration of these industries. Production in the chemical and allied products industry, for example, rose by 19 per cent from 1956 to 1958 while the ranks of production workers shrank by 36,000.

Automation in recent years has made deep inroads into the other major type of manufacturing production—the "cut-and-fit" industries. Automatic transfer and handling equipment has been introduced at an increasing pace in industries which cut and fit materials like metal, fabric, wood, leather, plastic, and rubber. In 1947, 648,000 automobile workers turned out 4.7 million cars and trucks, whereas a decade later, in 1957, 652,000 production workers turned out 7.2 million vehicles; after ten years, an increase of less than 1 per cent in number of blue-collar workers was enough to achieve a production gain of 50 per cent. Similarly, it takes only 12 men today, as against 20 on the eve of World War II, to produce a ton of steel an hour.

The significant fact about recent productivity gains in the cut-and-fit industries is that the greater part of the increase has been achieved by widespread application of highly engineered machinery. This is only the first step toward the push-button factory. The second step, application of feedback control, has hardly got started. Most of the 400-500 feedback systems now in use are in the continuous-flow industries, but complete automation has been

introduced there in relatively few plants and applied to relatively few operations. The United Auto Workers once estimated that if automobile production were fully automated, 200,000 men could do the work now done by 600,000.

Start on Automation in Offices and Banks

While factory workers have been hardest hit by blue-collar automation, clerical workers will be the most severely affected by white-collar automation. Electronic computers developed, tested, integrated, and sometimes operated by professional and technical experts are bound to displace clerks who perform routine assignments. Electronic computers, programmed to "remember" and to make judgments, can perform more accurately and efficiently than humans and far faster. Already they are being put to many uses.

Payroll work, including computation of wage payments and printing of checks for thousands of employees, has become a common chore of the computer. Some electric, gas, and telephone companies are making up monthly customer statements by using a computer system that lists and totals all items and addresses the bill. Insurance companies are employing computers to prepare premium notices, compute dividend payments, calculate commissions, make the countless computations needed by actuaries, and compile statistics. Supermarkets, textile plants, and other establishments that have started to use computers for inventory control can obtain a complete and detailed run-down of items at numerous locations in a matter of minutes. Airlines and hotel chains have installed computers to store and organize information which enables a clerk to answer questions about reservations in a matter of seconds.

The federal government has become a leading user of electronic equipment. Computers have become indispensable to the armed services in developing, launching, and tracking missiles and satellites. They are being rapidly put to use by the government also for non-military purposes. Such mountainous tasks as the keeping of records for the millions of persons covered by social security and the sorting of data collected by the Census Bureau are ideally suited for the computer. State governments likewise have started to install computers. A computing system in one state keeps records of five million automobile operators up to

date—by name, address, date of birth, sex, and driving offenses—and even determines fines for traffic violations.

Despite increased use of high-speed computers and related "miracle machines," the group most likely to be displaced by office automation—clerical workers—has continued so far to grow in size. One of every seven persons employed today is a clerical worker, whereas the ratio was one in ten as recently as 1940 and one in 40 at the turn of the century. Two basic reasons account for the still continuing increase: (1) The volume of clerical work has grown enormously, and (2) office automation has hardly got beyond the initial stages.

U.S. News & World Report has portrayed the rising tide of "paper work" in statistical fashion.[6] The number of life insurance policies and group insurance certificates has risen from 189 million in 1948 to 273 million today—an average annual increase of six million. American banks, which processed eight billion checks in 1952, processed 13 billion in 1958. Telephone companies in the Bell System send bills to more than 36 million subscribers today, compared to 23 million a decade ago. Payroll operations have grown not only in magnitude but also in complexity; it is now not unusual for a pay check to list eight or more deductions.

Office automation has done little more than establish a bridgehead in most industries. Fewer than 2,000 computers are believed to be in service, and 500 of the 2,000 are operated by military or other government personnel. A sizable number of the computers are still on trial; both business and government are apt to employ old and new techniques side by side until convinced that the computers have been thoroughly "debugged." Many more computers are on order than in use—around 3,500, it is estimated. The new machines will be used for operations to which automation has already been applied and for many additional operations. As an example of the latter, the American Bankers Association in mid-April published a report looking to complete mechanization of check handling by use of electronic machines that will "read" numerals and symbols printed in magnetic ink near the bottom of checks. Adoption of this system will make it possible to sort checks at a rate of 1,500 a minute instead of 1,000 an hour.

[6] "Revolution in Office Work," *U.S. News & World Report*, May 4, 1959, pp. 66-71.

Automation and Employment Changes

STUDIES have been undertaken to determine the probable long-term and short-term effects of major technological developments on job opportunities. The basic purpose of the long-term studies has been to get some idea of the kinds of jobs that will be disappearing and opening up in the years ahead, so that individuals, labor unions, and corporations can prepare for the anticipated changes. The short-term studies have been designed to find out what impact the introduction of automated equipment by particular companies has had on the workers. Another purpose of the studies has been to ascertain the effects of automation on job availability in the companies.

The Bureau of Labor Statistics, as part of its occupational outlook program, has worked up a set of occupational estimates for 1965. Commissioner Clague explained, Jan. 16, 1958, that these estimates were based primarily on "past trends and expected changes in technology," including automation. "Looking at the economy as a whole," he said, "the major changes appear to be *a*) a long-term rapid growth in the white-collar group of occupations; *b*) a slower growth in the blue-collar occupations but a continuing rise in the skill level; *c*) a decline in employment among farmers and farm workers; *d*) a faster than average growth among service workers."

Growth of Engineering and Technical Jobs

The white-collar work force surpassed the blue-collar work force in size for the first time in 1956, and the gap has been widening since that year. There are four broad categories of white-collar workers: Clerical; professional and technical; sales; supervisory and self-employed.[7] Each of these groups has been growing faster than the labor force as a whole, but the impact of technological change since the war can be readily seen. The clerical work force grew faster than any other occupation group in the population from 1910 to 1950, but the rate of increase has slowed down in the past decade. The fastest growing group of late has been the professional and technical, and within this group the greatest gains have been, not in the

[7] A total of 27.5 million white-collar workers were employed in April 1959: Clerical, 9.1 million; professional and technical, 7.2 million; sales, 4.3 million; supervisory and self-employed, 6.9 million.

traditional professions of law, medicine, teaching, and the ministry, but in scientific and engineering fields. Accompanying the expansion of employment of scientists and engineers has been a rapid rise in employment of technicians, such as draftsmen, electronic specialists, and engineering aides.

B.L.S. projections indicate that the labor force will have grown about 17 per cent in the 1955-65 decade; that professional and technical employment will have grown 150 per cent faster than the labor force as a whole; and that clerical employment will have grown 50 per cent faster. A recent study by the Department of Labor indicated where the expansion in clerical employment will be concentrated. The study said: "In general, clerks employed in routine and repetitive office jobs are the workers most likely to be [displaced] by the installation of electronic equipment." By contrast, "Clerical workers in jobs requiring the use of considerable judgment or contact with people . . . are least affected by automation." [8]

Coming Decline of Blue-Collar Employment

White-collar occupations accounted for 22 per cent of total employment in 1910, but by 1957 the proportion was 41 per cent. Blue-collar workers accounted for 38 per cent of all jobs in 1910, and for a much higher proportion in subsequent years, but by 1957 the ratio of blue-collar jobs had fallen back to 38 per cent. The blue-collar work force consists of three broad groups: Skilled workers (craftsmen, foremen, tool and die makers, etc.); semi-skilled workers (operators of single machines, assembly workers, truck drivers, etc.); and laborers.

Technological improvements have shrunk the blue-collar work force in chronological stages. From 1910 to 1950, the proportion of laborers in the total labor force declined from 11.6 per cent to 6.1 per cent. The proportion of semi-skilled workers rose in the same period from 14 to 21 per cent as a result of the growth of mass-production methods in industry. Since 1950, however, technological advances have slowed the growth rate of semi-skilled employment in the same way that they have started to affect clerical jobs. Commissioner Clague observed, Jan. 16, 1958, that semi-skilled employment had about held its own since World War

[8] Bureau of Labor Statistics, Department of Labor, *Automation and Employment Opportunities for Officeworkers* (October 1958), p. 6.

II but that it would probably decline as a proportion of the labor force during the next decade.[9]

Hardest hit among semi-skilled blue-collar workers have been those in manufacturing—seat of most blue-collar jobs. Manufacturing employment never has recovered the 17.2 million job level to which it rose before the 1953-54 recession—owing almost entirely to a decline in semi-skilled jobs. Indeed, while blue-collar jobs in manufacturing were dropping from 13.8 million in 1953 to 12.9 million in 1957, white-collar jobs in manufacturing were rising from 3.4 million to 3.9 million.[10] More striking, the proportion of white-collar workers in manufacturing has risen from 16 per cent in 1947 to more than 25 per cent today.

The only group of blue-collar jobs expected to buck current trends is that composed of skilled workers. Clague explained that "With the anticipated large increase in construction worker employment and the growing need for skilled maintenance and repairmen who can install, maintain, and repair increasingly complicated machinery and equipment, skilled workers are expected to increase at a somewhat faster rate than the labor force during the next decade."

Means of Easing Adjustment to Automation

The task of measuring the impact of major technological change on blue-collar or white-collar jobs in particular cases is extraordinarily difficult. There are basically four types of worker displacement: 1) External displacement, in which an employee is dismissed or laid off because of technological advance; 2) internal displacement, in which a worker whose job has been made obsolete is absorbed elsewhere in a company; 3) competitive displacement, in which an employee in Company B loses his job because Company A has pulled ahead technologically; 4) opportunity displacement, in which Company A or Company B slows down its rate of hiring following installation of more efficient machinery. Competitive and opportunity displacement are the two types that defy accurate measurement.[11]

[9] Clague added: "In contrast to the effects of mechanization in past decades which greatly increased the number of [semi-skilled workers], recent technological advances —e.g. automation—permit great gains in production without commensurate increases in the number of semi-skilled workers."

[10] The contrast would be even more extreme if made with the recession year of 1958. White-collar jobs in manufacturing held fairly firm during the recession at 3.8 million, but blue-collar jobs dropped more than a million to 11.7 million.

[11] By the same token, when a company automates its plants, it is virtually impossible to ascertain how many new jobs are thereby created in other companies.

The Bureau of Labor Statistics has completed five case studies in an effort to learn how much external and internal displacement have flowed from automation, and its effects on skill requirements and industrial relations. Three of the studies involved radical new production techniques in an oil refinery, a television manufacturing company, and a large mechanized bakery; the two other studies involved installation of computer systems by a large insurance company and a major airline. Edgar Weinberg, B.L.S. official who directed the studies, said in Washington on May 5:

> From these studies, two principles for making an orderly transition to automatic techniques have emerged. First, the desirability of timing introduction of automation for periods of company expansion. Second, the utility of taking advantage of a gradual unfolding of a major technological development to plan the personnel changes that are necessary. Following these two principles of scheduling, firms have introduced automation with the least dislocation of personnel.

Several conclusions drawn from the B.L.S. case studies would probably apply to the great majority of factories or offices affected by automation. First, large-scale dismissals are rarely necessary, because conversion to automation is seldom completed at one stroke. Automation of the TV plant, for example, reduced the number of assembly workers but hardly affected the riveting, packing, or shipping departments. Secondly, a company usually can absorb displaced workers when business is good. Automation was introduced during prosperous times in all five of the companies covered by the case studies, and no lay-offs resulted. Third, management can help to minimize worker hardship and uneasiness by taking preparatory steps in advance of the change-over. The TV plant took advantage of a high turnover of women workers and cut down on hiring while the automated equipment was being installed. The insurance company spent six months planning personnel reassignments before installing its computer and after telling its large number of women clerks that none would be fired.

Two other generalizations emerging from the B.L.S. studies concern mainly jobs rather than workers. First, most of the new factory and office jobs created by automation can be filled by existing personnel after on-the-job retraining. Secondly, the increased need for maintenance craftsmen under automation makes it important for management to give more attention to apprenticeship and to

retraining for certain skilled jobs. After full automation of the oil refinery, for example, it was found that nearly one-half of the blue-collar workers were engaged in maintenance work, and instrument repairmen had to be hired from outside.

Nearly all case studies on automation support these generalizations. On a few questions, however, the B.L.S. findings are not in accord with the results of other research. The most notable point of difference has to do with "upgrading." Some studies have borne out the standard prediction of five or six years ago that automation would lead to considerable upgrading of job content and skills. The five B.L.S. studies, while noting some upgrading, found that the preponderance of job changes involved transfer of relatively low-skilled blue or white-collar workers to jobs of equivalent grade; in some cases automation left workers no choice but to accept downgrading.

Use of the Collective Bargaining Procedure

When employees affected by automation belong to a labor union, the collective bargaining process may prove useful in minimizing hardship. Adjustment to technological change under collective bargaining has taken many forms. Most bargaining agreements contain no explicit reference to introduction or use of new machines or methods. In some agreements, however—perhaps as many as one-fourth—management specifically retains the right to introduce new machinery or methods in the manner it sees fit. Restrictions or prohibitions on management's freedom of action in this regard are found in fewer than one per cent of all collective bargaining agreements. Most agreements likewise contain no provision directed specifically to treatment of workers displaced by machines. The most notable exception—found in about one-third of all contracts—is a provision authorizing the union to participate in setting wage rates or work loads for new or changed jobs.[12]

Omission from a contract of specific clauses to meet technological change does not necessarily indicate lack of provision for dealing with the problem. Failure of one party or the other to have insisted upon inclusion of technology

[12] The last time collective bargaining agreements were examined in detail for specific provisions on technological change was in 1953, when the B.L.S. studied 1,410 agreements representing a cross-section of American industry. The estimates used above are based on this study, with slight modifications suggested by Department of Labor and A.F.L.-C.I.O. experts.

provisions may have stemmed from the fact that such problems have been dealt with implicitly in other provisions of the contract. Collective bargaining facilitates such an approach to automation in two ways. First, almost all labor contracts establish a grievance procedure which can often be used to settle questions raised by automation. Secondly, periodic negotiations over wage rates and fringe benefits in a new contract may take into account actual or expected technological changes.

The A.F.L.-C.I.O. said, the last time it reported on automation and bargaining: "Essentially, what most unions have sought in bargaining at the local level to take the sting out of technological change can be summed up as follows: 1) Advance notice and consultation; . . . 2) Negotiation on questions raised by new conditions; . . . 3) Protection for affected workers." [13] Advance notice enables a union to consider ways of minimizing adverse effects on workers. Negotiations give labor a voice in classifying new or changed jobs and in providing for the necessary training or retraining. The chief protections sought for workers whose jobs have been taken over by machines have been first crack at new jobs or at jobs available elsewhere; protection against wage loss on any transfer or demotion; and, for those who must be dismissed, severance pay to cushion the job loss.

Results of Union Efforts to Protect Labor

Taking the three broad A.F.L.-C.I.O. aims one by one, there apparently has been little conflict about advance notice. A company would find it difficult to spring automation on its workers, even if it wanted; major technological change-over takes months, often a year or two by the time debugging has been completed. The majority of automating companies, moreover, have found that advance notice helps in gaining worker acceptance of major change.

On the question of negotiating on new job and wage problems, most employers have not gone out of their way to hire from outside and usually have elected to retrain present employees for new positions. Indeed, training and retraining workers on an apprenticeship or in-plant basis is a long-accepted practice that has become an integral part of industrial operations. On the other hand, many com-

[13] Department of Research, A.F.L.-C.I.O., "Adjustment to Technological Change," *Collective Bargaining Report*, April-May 1958, p. 28.

panies after automating have strongly resisted union attempts to have jobs reclassified upward and wage rates altered accordingly. The burden of devising classifications for new jobs often has been left on union shoulders. Some companies have countered the union contention that jobs in automated plants entail more responsibility and therefore should command higher pay with the reminder that such jobs require less physical exertion. Labor-management disputes over adjustment to technological change have most often involved blue-collar workers. Such conflicts have seldom arisen where white-collar automation was planned, in part because of the small extent of white-collar unionization. The main reason for lack of conflict, however, has been the fact that firms about to automate office functions have nearly always assured their clerical employees that no lay-offs would result.

Unions have had considerable success in winning protection for seniority workers directly hit by technological advance. Most bargaining agreements aim to assure transfer of displaced workers on a seniority basis to other jobs with the company which they are qualified to perform or which they can quickly learn to perform. Some large industrial unions have won agreements requiring companies to pay the cost of moving for long-service workers displaced by machines who have no choice but to relocate with the company in another city.

Unions have been gaining acceptance of the view that workers dismissed by reason of technological change are entitled to severance pay to cushion the financial strains involved in losing one job and finding another. Only a handful of severance pay provisions were to be found a few years ago, but today they are included in more than one-fifth of major collective bargaining agreements. The typical dismissal allowance amounts to about five weeks' pay, assuming five years of service.

New Job Openings and Organized Labor

MOST COMPANIES, either on their own or after consultation with unions, arrange to introduce new equipment and processes gradually and at a time when the business is

expanding, in order to avoid as far as possible having to dismiss employees. During boom times the worker immediately displaced by automation has been "the one who was not hired." There is wide agreement, however, that automation has led to lay-offs in less efficient competing companies. With the onset of a business decline, moreover, new machinery and methods introduced in prosperity may make it possible to lay off thousands of semi-skilled workers and, judging by experience since the 1957-58 business downturn, many of them will not be rehired when better times return. This delayed impact of major technological change may show up even more strikingly in the wake of future recessions.

Creation of New Industries and Employment

What is really needed, experts from all quarters agree, is pursuit of economic and social policies which will assure that technological advance is accompanied by steady economic expansion. The question of how to stimulate economic growth has been fraught with controversy.[14] However, evidence is beginning to emerge that, in practice, automation will tend to make more jobs than it eliminates. In the first place, automation has created one whole new and booming industry—the industry that produces automation equipment. More than a thousand firms are engaged today, wholly or partly, in manufacture of automatic control devices. One of the fastest growing industries in the nation has been the instruments and related products industry, where employment has more than tripled since 1939.

Far more important is the fact that automation has made it possible to do many things, in both factories and offices, that could not be done without it. New goods and services, offering new job opportunities, have been originated. John Diebold, a top expert on automation, said recently in a study prepared for the National Planning Association: "Since the age of automation has only begun, it is impossible to anticipate all the new industries, but some of them already exist or can be guessed at."

> The entire atomic energy industry, present and future, rests on automation, for no human could operate valves or hand controls within an atomic reactor and live. Polyethylene, the flexible plastic widely used for packaging and for squeeze bottles, could not be made without automation. Color television, at a price that could attract a large market, will depend on automatic machines to lay

[14] See "Economic Growth," *E.R.R.*, 1959 Vol. I, pp. 325-341.

on the picture tube the hundreds of thousands of accurately spaced color dots. Chemists believe the chemical industry may be revolutionized by the use of high-speed computers to control reactions far too fast for human control. . . . "Every time you build an automatic machine," one enthusiastic industrialist has summed up, "the thing opens up new vistas of things you can do with it and products that you can make available that you never dreamed of before." [15]

Diebold said that displaced workers, in addition to filling jobs in the new industries made possible by automation, "may find a wealth of new openings in the service industries." Productivity gains in manufacturing are bound eventually to bring rising incomes and greater leisure. Employment in service industries will probably continue to grow—not only because of increasing demand for services, but also because many services are not susceptible to automation.

Drive to Raise Labor Benefits and Cut Hours

From the point of view of organized labor, industrial expansion means little if achieved at the cost of substantial unemployment and resulting loss of worker purchasing power. Measures long championed by organized labor—in particular, pensions, supplementary unemployment benefits, and shorter hours—have recently been given added emphasis as means of easing adjustment to automation. These measures differ from those designed to take the sting out of technological change, in that they are designed to better the lot of union members in general, not only those displaced by automation.

Most workers covered by collective bargaining agreements are now assured pensions for life, provided they have put in the required years of service before reaching retirement age. But the rise of automation has spurred union leaders to press for pension arrangements that will ease the plight of laid-off workers with long service. Provisions sought in this connection have been a worker option for earlier retirement, and the so-called vesting right, which entitles a worker to a pension at normal retirement age whether or not he remains with the company up to that time.

An estimated 10-20 percent of all contracts now provide for supplementary unemployment benefits, which are additional to state unemployment compensation and constitute

[15] John Diebold, *Automation: Its Impact on Business and Labor* (1959), pp. 29-30.

a kind of guaranteed annual wage.[16] The United Auto Workers, negotiating the first such plans in 1955, laid great stress on the claim that a company required to make payments to technologically displaced workers would have strong financial incentive to so schedule introduction of new machinery as to hold worker lay-offs to a minimum.

Some powerful unions, including the United Steelworkers of America, have been looking forward to a time when it may be necessary to reduce working hours in order to spread employment. The union view is that shortening hours is a desirable way to avoid technological displacement as well as to enable workers to share productivity gains. In September 1956, Peter Henle, assistant research director of the A.F.L.-C.I.O., pointed out that a reduction of hours could be effected by adopting: (1) a shorter work day; (2) a shorter work week; (3) a shorter work week periodically; (4) a shorter work year, i.e. longer paid vacations, more paid holidays, etc.

The two latter methods have won favor among officials of the Steelworkers union, now seeking agreement with the steel companies on a new contract to replace the contract expiring June 30. The union's president, David J. McDonald, said on March 20 that 30,000 jobs would be created if his proposal to give steelworkers a three-month paid vacation every five years were adopted. He said the proposal would cost "about 12c an hour" and that the union intended "to talk very seriously about it at our coming wage negotiations."

Although McDonald's vacation plan gained wide attention as "a pre-retirement training program," it has been hinted that the union will not press for it this year. Instead, the Steelworkers are expected to work for what would amount to a 38-hour week with pay for 40 hours.[17]

Effect of Automation on the Labor Movement

The great importance unions have come to attach to these and other fringe benefits results, in part, from recognition by labor that it is futile to try to halt technological change. Ironically, however, the very unions that have spearheaded the drive to adjust to technological change are

[16] See "Lay-Off Pay Plans," *E.R.R.*, 1956 Vol. I, pp. 355-372.

[17] The union plan reportedly calls for standard eight-hour shifts in a cycle of three five-day weeks followed by a four-day week. This would make an average work-week of 38 hours. According to the union, the plan would cost about 15c an hour.

those threatened with diminished influence as a consequence of automation. The big industrial union, like the trade union movement in general, derives most of its strength from blue-collar workers; around 85 per cent of the 17 million or 18 million American trade unionists belong in the blue-collar ranks. Taking note of postwar developments, Everett M. Kassalow, research director of the Industrial Union Department, A.F.L.-C.I.O., said last June 27: "Given the trends of recent years and projections of the future composition of the labor force, the organization of the non-blue collar worker takes on an almost life and death character for the American labor movement."

While acknowledging that unique factors enhance the difficulty of bringing white-collar workers into the fold,[18] labor leaders are proceeding on the assumption that unions themselves are in considerable part to blame for the limited extent of white-collar unionization. They note that throughout the 1930s and 1940s organizing efforts were concentrated on manual workers in manufacturing, construction, and transportation.

All of the big unions now are trying to devise ways of organizing the white-collar professional and technical workers who, in effect, are moving into the places of present union members. The difficult task confronting union organizers has been made more difficult by one of the consequences of automation. Company after company has decided that older plants in established locations are not suitable for the new electronic devices and processes. Obsolete two and three-story structures are being scrapped in favor of one-level plants built in places where land is cheaper and markets more plentiful. New plants in the electrical industry, the chemical industry, the paper industry, the automobile industry and many others are going up in areas where important industrial plants were hitherto unknown.

This trend away from industrial concentration not only has contributed to union loss of members left behind without work in the cities, but also has made it harder for union organizers to enroll new blue-collar workers. Many of the new plants have gone up in rural areas or in states

[18] Among reasons often given for the lag in organization of white-collar workers is the tendency of such workers a) to identify themselves with management interests and problems; b) to feel an aversion to being grouped with "the laboring class"; and c) to believe that it would be more difficult to win advancement on individual merit if organized for collective action. In addition, many employers have adopted personnel policies designed to steal the thunder of unions wishing to organize white-collar employees.

where public attitudes toward organized labor have traditionally ranged from indifferent to hostile. The need to organize seems less compelling to workers in clean, modern factories than it did in outmoded, badly ventilated plants in urban industrial centers. To organize workers in the smaller plants prevalent today is inherently more difficult than it was in the giant factories of earlier decades.[19]

Most labor spokesmen freely admit that primary responsibility for preventing the decline of trade unionism in the United States rests on their shoulders. But they insist that certain changes in public policy also are needed if automation is to be kept from doing more harm than good. Industrial and mining centers that have become depressed areas, in part or in whole because of automation, can be helped back on their feet by legislation that will help them to attract new business and to provide vocational retraining, union leaders and others assert.

As for the task of organizing white-collar workers, union officials would like to see revision of that provision of the Taft-Hartley Act which gives professional and technical white-collar workers a clear-cut right to except themselves from inclusion in a bargaining unit which includes blue-collar workers. Everett Kassalow of the A.F.L.-C.I.O. said last June 27: "If you believe as I do, that no modern industrial society can be truly democratic without effective representation of workers' interests by trade unions, then you will also believe as I do that the very functioning of American democracy will be jeopardized unless the unions succeed in extending their role of representation to include great numbers of non-blue collar workers."

[19] See "Union Organizing," *E.R.R.*, 1956 Vol. II, pp. 751-768.